

## CLAIMS

1. An active matrix electroluminescent display device comprising an array of display pixels, each pixel comprising:
  - 5 an electroluminescent display element (2);
  - a drive transistor (22) for driving a current through the display element (2);
  - a storage capacitor (24) for storing a voltage to be used for addressing the drive transistor;
  - 10 a discharge photodiode (27) for discharging the storage capacitor (24) in dependence on the light output of the display element; and
  - circuit elements for changing an input data voltage applied to the pixel by an amount corresponding to the threshold voltage of the drive transistor, and for applying the changed data voltage between the gate and source of the
  - 15 drive transistor (22).
2. A device as claimed in claim 1, wherein each pixel further comprises an address transistor (16) connected between a data signal line (6) and an input to the pixel.
- 20 3. A device as claimed in claim 1 or 2, wherein the drive transistor (22) is connected between a power supply line (26) and the display element (2).
4. A device as claimed in claim 3, wherein the storage capacitor (24) is
- 25 connected between the power supply line (26) and the gate of the drive transistor (22).
5. A device as claimed in claim 3, wherein the circuit elements comprise a second photodiode (30) and a second storage capacitor (32), wherein the
- 30 second photodiode (30) is connected between the gate of the drive transistor (22) and one terminal of the second storage capacitor (32), and the discharge

photodiode (27) is connected between the one terminal and the power supply line (26).

6. A device as claimed in claim 5, wherein data input to the pixel is supplied to the other second terminal of the second storage capacitor (32).

7. A device as claimed in claim 5 or 6, wherein the circuit elements further comprise an isolating transistor (34) connected between the drive transistor (22) and the display element (2).

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8. A device as claimed in claim 4, wherein the photodiode (27) is connected between the power supply line (26) and the gate of the drive transistor (22), and the circuit elements comprise two parallel oppositely facing diode-connected transistors (50,52), connected between the input to the pixel and the gate of the drive transistor (22).

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9. A device as claimed in claim 3, wherein the storage capacitor (24) and the discharge photodiode (27) are connected in parallel between the power supply line (26) and an input to the pixel, and the circuit elements comprise a threshold storage capacitor (40) connected between the input and the gate of the drive transistor (22).

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10. A device as claimed in claim 9, wherein the circuit elements further comprise a bypass transistor (42) connected between the source and gate of the drive transistor (22) for charging the threshold storage capacitor (40) to the threshold voltage using a current of the drive transistor (22).

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11. An active matrix electroluminescent display device comprising an array of display pixels, each pixel comprising:

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an electroluminescent display element (2);

a current sampling circuit for sampling a drive current and including a drive transistor (22) for driving current through the display element;

a storage capacitor (24) for storing a gate-source voltage for the drive transistor (22) corresponding to the sampled drive current; and

a photodiode (27) for discharging the storage capacitor (24) in dependence on the light output of the display element.

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12. A device as claimed in claim 11, wherein the current sampling circuit comprises an isolating transistor (34) for selectively isolating the drive transistor (22) from the display element (2) and a bypass transistor (60) for selectively connecting the drive transistor (22) to the input of the pixel.

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13. A method of driving an active matrix electroluminescent display device comprising an array of display pixels each comprising a drive transistor (22) and an electroluminescent display element (2), the method comprising, for each addressing of the pixel:

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applying a drive voltage to an input of the pixel;

modifying the drive voltage by an amount corresponding to the threshold voltage of the drive transistor (22);

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storing the modified drive voltage in a capacitor arrangement and applying the modified drive voltage to the gate of the drive transistor, thereby compensating for threshold variations between drive transistors of different pixels; and

discharging the capacitor arrangement using a photodiode (27) illuminated by the light output of the electroluminescent display element, thereby compensating for aging variations between pixels.

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14. A method as claimed in claim 13, wherein storing the modified drive voltage comprises storing the modified drive voltage on a capacitor (24).

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15. A method as claimed in claim 13, wherein storing the modified drive voltage comprises storing the drive voltage on a first capacitor (24) and storing a voltage corresponding to the threshold voltage of the drive transistor on a second capacitor (40).

16. A method as claimed in claim 13, wherein storing the modified drive voltage comprises pumping the drive voltage onto a storage capacitor (24) on which a voltage corresponding to the threshold voltage was previously  
5 provided.

17. A method of driving an active matrix electroluminescent display device comprising an array of display pixels each comprising a drive transistor (22) and an electroluminescent display element (2), the method comprising, for  
10 each addressing of the pixel:

applying a drive current to an input of the pixel;  
sampling the drive current to obtain a gate-source voltage of the drive transistor corresponding to the drive current;  
storing the gate-source voltage on a storage capacitor (24);  
15 applying the gate-source voltage to the drive transistor; and  
discharging the storage capacitor using a photodiode illuminated by the light output of the electroluminescent display element.